



# **AUTOMATED CONTROL APPROACH FOR INDUSTRIAL WELDING TRANSFORMER TO MINIMIZE THE IDLING POWER LOSS**

A dissertation submitted to the Department of Electrical Engineering,  
University of Moratuwa in partial fulfillment of the requirement for the  
degree of Master of Science

by

ALAHAKOONGE, DON MIKE JEETH

Supervised by Dr. Nalin Wickramarachchi

Department of Electrical Engineering  
University of Moratuwa  
Sri Lanka

2009

93952



## Abstract

Main objective is to design and implement automated control circuit to switch ON & OFF main power feeding contactor of industrial welding transformer, depend on the work pattern. Voltage sensing at the out put terminals of secondary winding of welding transformer is used as a one and only input signal for the control circuit. Reduced voltage 24 VAC is supplied to primary during idling and during operation it converts in to 400 VAC, and this conversion takes place automatically. By that, able to reduce idling power loss on primary winding due to open circuit core loss & iron loss.

During designing of new system special attention was made, not to change existing conventional welding procedure and not to introduce additional external sensors and cables other than conventional welding electrode and welding cable.

New system was practically implemented in yard and tested for long period of time in different work conditions in Colombo Dockyard PLC. System was tested with existing conventional welders but no behavioral changes were observed during welding operation after implementing new system. Successful trails were carried out and proved it uninterrupt operation.

Under guidance and instructions of my project supervisor I worked and finally able to came up with practically feasible solution. This report describes problem identification, how the design concept developed, power saving and cost benefits .to yard after implementation of new system.

The report starts with an introduction as a 1st chapter where describe the current welding practice at Colombo Dockyard PLC, how to reduce idling power loss by implementing new method and final goal of my project. 2nd chapter describes the statement of the problem and problem identification, new solution and how it affects to save energy.



The 3rd chapter consists with gathered technical data and its analysis during execution of design approach.

Next 4th chapter describe about proposed and implemented solutions for the identified problem and evolution of design concept.

Fifth chapter describes the energy saving calculations and cost benefit analysis. Finally, in the conclusion, I have explained practically and economically viability of new product as a industrial product.